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INTERVIEW

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New knowledge for a new planet: critical pedagogy for the Anthropocene

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In and against the hypocritical theory

Petar Jandrić (PJ): Ken, thank you a lot for this interview – and for your valuable advice regarding other interviews in this series. Upon completing my research on your rich bibliography, I could not help but wonder how it arrived into being. You are an academic researcher – but your book *I'm very into you: Correspondence 1995—1996* (Acker & Wark, 2015) is a collection of emails. *A hacker manifesto* (Wark, 2004) speaks of the present and future caused by digital technologies – but *The beach beneath the street: The everyday life and glorious times of the Situationist International* (2011a) is firmly dedicated to the past. Your writing style is dense and ambiguous, yet your multimedia works such as *Totality for kids* (Loyer, Pyle, & Wark, 2009) speak loud and clear, and you often engage in experimental writings such as *Speed factory* (Cohen, Kinsella, White, & Wark, 2002). Certainly, these diverse ways of probing reality are focused to similar questions – for instance, *Gamer theory* website (2006) served as a base for the book with the same title (2007), while *Totality for kids* (Loyer et al., 2009) talks about the Situationist International (Wark, 2008, 2011a). What is your inspiration for asking similar questions using different approaches? What do you expect to achieve with such approach?

McKenzie Wark (MW): Well, first and last I am a writer, and writers have to find readers and find ways of engaging and keeping the interest of readers. This takes a particular form if you are a twenty-first-century writer, where the old print-based forms we have known for the whole of the modern period have been displaced – I will not quite say replaced – by other means.

Hence I am interested in experimenting with ways of writing and also ways of finding and engaging readers. So *Speed factory* (Cohen et al., 2002) was an experiment in ways of writing. It is a game played over email, where a writer sends *exactly* 300 words to another, and the other writes the next 300. It is fun to stop in the middle of a sentence and have someone complete your thought! It is also a sort of diaspora game, as the other players were all over the world, in other time zones, so interesting rhythms emerge.

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Totality for kids (Loyer et al., 2009) was more about how to archive and present materials about an historic avant-garde. How can the materials be available free from copyright restrictions? How can the look and feel of an era be invoked? That was why I worked with the graphic novelist Kevin Pyle. Eric Loyer and Steve Anderson then built a relation between the graphic front-end and a database behind it, which held all the resources with which you could learn or teach about the early days of the Situationist International. So it is a different kind of thing to *Speed factory* (Cohen et al., 2002), but what I think all these things have in common is practical experiments with forms of reader-writer relation in our times.

PJ: In *Telesthesia* (Wark, 2012, p. 12) you introduce an important distinction between low theory and high theory. Could you please explain the main differences between these concepts? Where do they meet; how do they interact?

MW: High theory I think of as the scholarly tradition of continental philosophy, as shaped by institutions of higher learning and scholarly conventions of agenda-formation, of vetting and authorizing statements, and so on. To be a recognized authority of high theory is to be a professor who studied with distinguished professors, who publishes or teaches in distinguished places, and so on. It is a discourse-network based on peer review and competition within hierarchies for glittering prizes.

Low theory is more about how subaltern or subordinate groups form a conceptual language to understand their situation, and to either escape it or struggle within it. One of the great historical examples of low theory is Marxism, but there are many other examples. To the extent that any oppressed and marginalized group borrows concepts or forges concepts specific to their situation, and produces means of communicating for thinking for themselves, then I think one has an example of low theory. Obviously, high and low theory interact all the time. Low theory borrows from high theory; high theory sometimes recuperates and canonizes low theory – Spinoza and Marx and low theorists who became canonized, for example. Neither was a professor.

PJ: In the article *Cyberculture studies: An antidisciplinary approach (version 3.0)* you make a clear case for abandoning traditional academic disciplines and creating a new antidisciplinary understanding of the world. And you are not alone: such claims have been made in various fields from ecology to education. However, as far as I am aware, you are the first person who assigned a clear political agenda to the project of antidisciplinarity. In your words,

> Cyberculture has the potential to be not just another discipline but the end of disciplines as a way of maintaining the scarcity of knowledge. Cyberculture studies can be the point at which the liberation of knowledge from scarcity begins as a self-conscious process. Cyberculture studies can be the critical theory – not the hypocritical theory – of the production of knowledge in itself and for itself. (2006, p. 72)

What are the main differences between the critical theory and the hypocritical theory? How are they related to our choice of research method?

MW: Well, perhaps we lost that one! So called 'cyberculture' or 'new media' got absorbed into conventional scholarly forms of publishing and prestige, and so on. It is hard to avoid. I

had to do all that myself in order to get academic jobs in America. I published two books with Harvard University Press so that I would have some 'credentials'. But of course I made sure those books also circulated in other ways, and much more freely, via Listservs and free pdfs and in pirate translation and so forth. And for *Gamer theory* (Wark, 2007) I collaborated with the Institute for the Future of the Book to design a space where I could work on the book with people who had very different kinds of 'expertise', as academics, information scientists, or as hard-core gamers.

So in short, my own work is often hypocritical theory, in that it says one thing but does another, where it questions unequal modes of knowledge production and yet participates in them. I never wanted hypocritical theory to be a moralistic charge levelled at others. All critical theory is hypocritical theory. It always has an internal tension between its form and content. But one can at least try to be critical about this hypocritical structure of knowledge! One can at least experiment with what other modes of writing and reading might be. That did stem out of 'cyberculture' too. So while in part it led to an absorption of these new topics into the old institutional forms, it also led to some new ones, to open access journals, free online lectures, autonomous libraries, and so on.

PJ: Nowadays, it is clear that the traditional Marxist binary between the bourgeoisie and the proletariat has significantly transformed. In *A hacker Manifesto* (Wark, 2004), you outline emergence of several new classes – most notably, the hacker class – and analyze various phenomena using the new class arrangements as a point of departure. Could you please outline your view to class structure in the contemporary society? How does it differ from the traditional Marxist classification?

MW: Well, in *Capital* (1976) Marx was cutting away the multi-class dynamic to reveal what he thought was at its core. In texts such as 'The eighteenth Brumaire' (Marx, 1852) he has a much more subtle and fluid understanding of the many modes of production that can overlap and the complexities of class relations this gives rise to. Gramsci later takes up and expands that view.

In *A hacker manifesto* (Wark, 2004) I really went against the grain and insisted, contrary to the then-popular post-Marxist view, that class was both crucial to understanding history and also not all that complicated to work out. So even among theorists of class it was not a view that stressed a multi-factor approach to how classes were formed. Nor, like the Italian workerists, did it see the working class only in terms of its self-formation.

Having been in law school for a while, and having had some first-hand experience of how contracts are written in things like the film industry, it seemed to me that a central place to start was the evolution of the property form. While patent and copyright are old legal forms, their evolution speeded up in the late twentieth century, both making them closer to absolute private-property rights, and in their convergence toward a category of 'intellectual property'.

Well, where you have new kinds of private property – a new enclosure movement – you probably have new kinds of class relation forming. Hence in my view the emergence of intellectual property as close to an absolute private-property right is the symptom of the formation of new classes: a class who owns such property – the vectoral class, owners of the information vector. And a class of producers dispossessed of what they produced – the hacker class. Here I think the 'hack' broadly, as any activity producing

new information out of the old, that can be captured by the regime of intellectual property.

PJ: As of recently, there is an increasing body of research which describes new class arrangements using various classifications. For instance, in *The precariat: The new dangerous class* (Standing, 2011) and *A precariat charter: From denizens to citizens* (Standing, 2014), Guy Standing describes the emergence of a new class society. Obviously, his analysis of class is very different from yours. For Standing, the precariat is defined by (the lack of) employment and property; for you, 'by its very nature, the act of hacking overcomes the limits property imposes on it' (Wark, 2004, p. 80). How do you conceive these parallel descriptions of our social reality? Are they incommensurable and competitive, or they can be used simultaneously? Is it meaningful to talk about mixed-concepts such 'the precarious hacker' and 'the bourgeoisie vectoralist'?

MW: Well, it might be a question of seeing how these things are related. How the rise of the vectoral class made the working-class precarious again, as the information vector routes around the power of organized labor. The experience of being in a precarious situation is nothing new at all. That is the historic condition of the working class: dispossessed of the direct means of production, thrown off its land, holed up in the great industrial cities, living hand to mouth from whatever job it can get. What is exceptional is the period of relative security, when organized labor made some gains, and capital had to meet those demands, for legal unions, for a limit to the working day, for job security, for the social wage, for free education, and so on. Once capital was able to escape from the space of the nation state, those victories started to be unwound, and hence today's new precarity in the over-developed world, and the expansion of the old precarity in the under-developed world.

Now: what gave capital the upper hand? The most common answer is to invoke 'neoliberalism', as if ideas worked by magic. A more materialist analysis might show that what changed is the power of what I call the vectoral. In geometry a vector is a line of fixed length that can be in any position. That to me is a sort of diagram of how communication technologies work. They have certain affordances, but can in principle connect anything to anything. What unfolded in the late twentieth century was the rise of two kinds of vector. The extensive one, which is an infrastructure connecting the world together, which moves information faster than commodities or labor, and hence comes to organize and control them. The extensive vector began long ago with the telegraph, but it really develops and speeds up much later. Particularly when combined with the intensive vector, or computation, which is able to relate bits of information to each other, to manage data with algorithms, to play out possible scenarios which might combine labor and commodities, and so on.

But the irony is, what was supposed to enable capital to escape from the power of organized labor actually ends up controlling not just labor but capital as well. The ruling class changes form. Its power rests not in owning capital but controlling the vector – a vectoralist class. It owns the intellectual property – the patents, brands, copyrights, trademarks. It controls the vectors of intensive and extensive information flow. It extracts surplus information from not only labor but now also from non-labor, from everything you do on the Internet or on your cellphone. So just as a capitalist class freed itself from landed property

and built a more abstract form of class power, so now a vectoralist class frees itself from capital by building a more abstracted form of class power.

PJ: Speaking of abstraction, you warn that 'a class is not the same as its representation. In politics one must beware of representations held out to be classes, which represent only a fraction of a class and do not express its multiple interests' (Wark, 2004, p. 45). At the one hand, we cannot analyze culture without class. At the other hand, however, it seems that all representations will always be partial. How can we resolve this puzzle?

MW: This was by way of refusing the post-Marxist analyses of Laclau and Mouffe and others, for which politics is essentially discursive, where class is just one representational form to be articulated to the others. It is to insist on another paradigm where class is not representational at all. Class is implicated in struggles around the development of the mode of production whether the participants in it are conscious of it or not. One cannot really understand someone by what they say about themselves, as Marx says already in the *Contribution to the critique of political economy* (Marx, 1859). And yet one can read *ad nauseum* purported analyses where the hacker class is reduced to the false consciousness of one of its fractions.

Yes, some of the technically trained 'brogrammers' of today really believe in libertarian ideologies. But what is interesting is to explore the gap between those ideologies and actual experiences. Very few people get rich off their own start-ups. The so-called venture capital firms (a subset of the vectoralist class) hedge their bets and win on the averages. And certainly while that fraction of the hacker class can be very well paid, and have a concierge service at work with free meals and all that, it is basically because you are at work 24/7. Not just your waking hours, but your dreaming hours, are for the boss. This is not to say that things like race and gender are unimportant. Quite the contrary, it is to see each of these dimensions as qualitatively different and not reducible to the same place of agonistics.

PJ: Digital technologies provide new opportunities for learning – and the hacker class seems to get the best of these opportunities. What about the other classes? What are the potentials of digital technologies for wide critical emancipation?

MW: If one takes the long view, the democratizing of education is usually seen as flowing from new technologies, but these tend to end up subordinated to other objectives. Let us not forget that mass print, radio, and television were all hailed as great democratizers. When Adorno was set to work studying radio when he came to America he was supposed to be showing what a boon to musical literacy it was to play classical music over the radio. He did not last too long in that job, as he naturally concluded that over AM radio you really could not hear the music at all, but the static was potentially interesting!

Still, if one was to study the rise of the hacker class (in the narrow sense) in the United States, it is a curious story. If one looks at the engineers who went on to fame at Bell Labs and MIT, they were often from fairly humble Midwestern backgrounds. The start out tinkering with farm equipment. They excel at mathematics and sciences at school, get spotted by teachers and sent off to good colleges on scholarships. They succeed in things you did not need cultural capital to get into. The hacker class has very mixed

origins socially, but one interesting strand of it is self-creating through knowledge and makes good use of democratized education where and when it exists.

PJ: In *A hacker manifesto*, you call for

> a new pedagogy of the oppressed, and one not just aimed at making the subaltern feel better about themselves as subjects in an emerging vectoral world of multicultural spectacle, but which provides the tools for struggling against this ongoing objectification of the world's producing classes. (Wark, 2004, p. 64)

As a critical pedagogue, I am immediately reminded of Paulo Freire's *Pedagogy of the oppressed* (Freire, 1972) – and of dire struggles associated with reinventing his thinking in the age of the network. Could you please outline historical connections between the analog and the digital pedagogy of the oppressed? What does it mean to think critically about human learning in the network society?

MW: I have not read Freire for a long time, but yes, he was the example I had in mind there. The problem is that the ruling class of our time, what I call the vectoral class, is building an information infrastructure that is about anything but free and autonomous learning, subaltern community creation, distributed and self-organized innovation. It is much more about commodifying all forms of social activity, keeping human agents isolated as consuming nodes but also an unequal exchange of information in which they give up data to surveillance but never get to see the metadata. The new modes of exploitation and alienation are based on unequal information exchange, but more crucially on subordinating the form of information always to the general equivalent, to exchange value – in short to the money form. So to think critically about human learning today one has to think critically about the form of the communication vector itself.

All that was solid state splits into digital bits

PJ: Third nature, or telesthesia, is one of the central concepts in your work. Could you please briefly outline its main characteristics?

MW: Telesthesia means perception at a distance. We have always had means of sensing things that are non-local. I am not an ethnographer of these things, but examples might include those traditional peoples in the Andes who have a way of predicting the El Niño weather system from certain effects in the sky, or the indigenous navigators of the Pacific who could steer their rafts between the islands. But my particular interest is modern telesthesia, which I think starts with the telegraph. It is the first vector that moves information faster than people or things. It becomes the means via which to organize those movements. As Carey (2009) argued, when we say 'market' we now mean not a place people come to, but a space made by telegraphy, where information about the price and availability of commodities can move across the space and organize the movement of those commodities.

So I think the telegraph starts a transformation of the world, where telesthesia becomes a general condition, a third nature. I think of second nature as the built environment that social labor constructs to wrest freedom from necessity. Our species-being is as builders of

worlds. So we built a second nature to inhabit, transforming nature into a world that appears as if it was there for us. But the contradictions and complexities of building and maintaining second nature push toward the development of a third nature, made out of the flows of information rather than of things. The struggle now is whether that third nature can control a second nature which threatens to destroy the nature on which it depends.

PJ: Telesthesia blends work and leisure, the public and the private … 'All that was solid state splits into digital bits' (Wark, 2012, p. 62). What, if anything, remains non-relativist?

MW: The division between work and leisure *time* is a modern invention that for certain classes of people is going away. It is no longer clear when one works or what produces value, so the aim of the vectoral class is to extract surplus information from all activities without exception. Henceforth anything you do on your computer will yield data, and of course anything you do with your phone. Merely walking around with the phone close to your body will yield a stream of data about your movements.

Hence there is no division between public and private. For a lot of people there never was in the first place. Privacy is something of a bourgeois privilege. Working people have been subjected to all sorts of intrusions by the state and the police. But now basically all of your data is in the hands of the police, and a lot of it is in the hands of companies of the vectoralist kind. The difference is that while in the old days actual human spies would follow 'people of interest', now algorithms just pick out patterns that may or may not be 'suspicious'.

But I do not think this is a postmodern story about everything becoming 'relative'. Quite the contrary. Something is becoming absolute, or attempting to become absolute: namely, power over the resources and populations of the planet maintained by asymmetries of information. And as the Earth scientists keep reminding us, it is very clear that the planet can't accommodate the endless expansion of commodification any longer. Nothing 'relativist' about that.

PJ: Telesthesia influences our lives in various fundamental ways. Amongst others, it 'produces the abstract speed by which all other speeds are measured and monitored' (Wark, 2004, p. 314). However, the 'social' and the 'technical' acceleration are still frequently discussed as separate spheres rather than as mutually shaping of each other within capitalism. Could you please briefly outline the relationships between telesthesia, social acceleration, and neoliberal capitalism?

MW: Well, I do not see 'neoliberal' as a very helpful description, other than as describing a certain trend in economic theory that became an ideology. I do not see ideologies as causes, I see them more as effects. So the question would be: What material-historical changes led to the rise of neoliberal ideologies as imaginary solutions to real social crises? So for me, the determining historical movement is the development of the forces of production in the direction of systems of information control. (In this sense I am a very vulgar Marxist!) Those new forces burst through the fetters of the Fordist mode of economic and social regulation, reconfiguring the spatial distribution of

productive resources. It was no longer necessary to have parts of the production system adjacent to each other.

I saw this happen quite literally in the newspaper industry. When I was writing for newspapers, the paper itself was printed in the same building as the journalists worked. It would be a giant factory in the middle of the city. The information to go into the paper would move through the building physically, for example through vacuum tubes. But once it was computerized, the printing plant did not need to be in the same place as the journalists and managers. You just send the data electronically to the plant on the edge of the city, where it is cheaper to print it and easier to transport. The newspaper became a computer print-out. Then of course even the paper as mode of distribution of the information became obsolete. That is just a little snapshot of a vast reorganization of production that could happen once it is cheap and easy to move information.

But it is not so much about speed as complexity. In *Gamer theory* (2007) I argue that space ceases to be topographic and becomes *topological*. Meaning that the heavy infrastructure of telesthesia starts to build a third nature that ignores the topographical form of the world as much as it can. This is a third nature that is constantly evaluating *everything* on the planet as a resource for production and shunting resources all over the place according to logics of comparative opportunity and probability. What was in origin a military logistics became the basis of a new order of production, which may or may not still be 'capitalist' – is perhaps more accurately described as 'vectoralist'.

PJ: A few days ago, you shared an article which claims that the age of the Anthropocene has brought about Frantz Fanon's worst nightmares. What exactly are those nightmares? More generally, can you look at the above issues from a postcolonial perspective?

MW: Postcolonial theory includes those stories, experiences, histories, and literatures that are all about the violently enforced imposition of universal models of man, Western rationality and all that. It requires an understanding of sophisticated and complex relations to see how Indian independence is at one at the same time national self-exertion, but also a claiming of a certain modernity and rationality and science, and so on. The two main figures of the May 4th movement in China, 'Mr Democracy' and 'Mr Science' (Hudson, 2008), were, at one hand, witnessing the imposition of the universalizing West and at the same time wanting to reclaim a piece of it. And after the disaster of the Cultural Revolution, they are actually doing that. So much of great science is nowadays based in China, because they are pouring resources into it.

So postcolonialism is useful in thinking outside of a certain kind of universalism. Then, the challenge is to be in dialogue with different thoughts at the planetary scale, and to actually separate that dialogue from the universal. It is a really problematic and tricky thing to do, because Earth science is planetary in scale, but it always intersects with local and specific and contingent histories. In the colonial histories we can see the real violence of it, so that is one of the really big challenges in producing useful pedagogy at the moment.

PJ: According to Said (1993), colonization is always about the territory. Can we perhaps consider the metaphor of colonization of the virtuality (Jandrić & Kuzmanić, 2015)? What are the main pros and cons for that metaphor?

MW: With all due respect to Edward Said, I think this is actually not true, and I think it was Lord Curzon who said that the interest of the British Empire in the Middle East was equal parts strategic, commercial, and telegraphical (Mowlana, 1992, p. 36). At a time before ocean telegraphy seemed feasible and reliable, if you wanted landline telegraphic communication in India, you had to pass through the land. So one little element of Said's claim is true, in a sense that you have to control the territory to connect it to other territory that matters a lot more. Which, in the twenty-first century, is probably very relevant in the geopolitics of infrastructures like pipelines. Pipelines always seem to pass through places that the Great Powers do not really care about, but have to be 'secured'. So, in that sense, these are already abstract spaces.

Space is one of the interesting spheres of struggle in a sense that, as the Brazilians figured it out, if you want to prevent your friends from spying on all your communications, you need your own pipeline for data (Borger, 2013). Even the German government had to figure that part out in a hard way (Gebauer, 2015). There is a sense in which information creates a whole different geopolitics. Information can get from anywhere to anywhere, but it does so often through quite specific pipelines – one needs to map them to see this as a new geopolitics. And this geopolitics is independent of the state system, or sea lanes, or the other traditional maps. Benjamin Bratton is good at this thinking of planetary computation as a space of geopolitics that has a new map.

PJ: The Internet is a physical thing, and the one that consumes a lot of energy at that …

MW: Exactly. You need to be near power station, you need to ensure cooling … there is a really specific material foundation to the Internet – it is not virtual. It makes it appear as if there is a third nature, but it is only partly so. You can fold the topographic map with an information vector that creates a new and abstract topology, but in actuality there is still a geopolitics of resources underneath it all.

PJ: Can you link these trends with human learning?

MW: Well, the first challenge might be learning ways to even describe them. Social theory tends to be tradition bound. Once one has studied the classics of social thought, one naturally wants the world to conform to those conceptual descriptions. So for example if one studies Foucault closely, one sees what one wants to see: that aspect of the world that still looks like the nineteenth century his classic works describe. The Marxists are the same. They want to see those aspects that still look like nineteenth century capitalism.

Then there is the opposite tendency, which is to declare everything that happened in one's own time as radical and new, and to think through a binary break. This gives the weak language of modifiers: neoliberalism, postmodernism, late capitalism, and so on. It is always salutary to imagine that one is not living in a great moment of crisis and transition. Hence to my way of thinking, the contours of the current historical stage started to form a long time ago, perhaps even when some of the classic nineteenth-century social thought was formed, Marx and Weber, for example. The owl of Minerva flies at dusk. Concepts always grasp what is completed and past. So the first challenge for education is to think how to even describe the more abstract contours of the present in a way that is neither old wine in new bottles nor new wine in old bottles.

But beyond that, I think the times call for a reorganization of knowledge work. The old divisions of labor seem not to apply. It seems that, in the Anthropocene – when nature starts to interrupt third nature – the separation of social from natural science is not tenable. There is no 'stable' natural basis for the social any more. Yet at the same time we need to avoid trying to reduce the social sciences to the natural sciences, as if waving the word 'neuroscience' or the word 'genetics' explained everything. So I think the challenge is a new organization of knowledge, a new mode of cooperation. Perhaps not so new in the sciences themselves, which may be far, far ahead of the humanities and social sciences in this regard. Look for example at the way climate science emerged as a transnational scientific community, combining specialists in mathematical physics, computer modelling, satellite instrumentation, and so forth. And one fully aware of the political obstacles in the way of doing such science, let alone acting on it. So I think the question becomes: Can we use the tools that are available to reconfigure knowledge for this newly unstable planet on which we now live? Our social and political theories are all from a planet that no longer exists.

PJ: We might live on a new planet, but we still need theories from the old planet – it is only in relation to our past, that we can understand our present and future. When we look into the past, however, we need to choose our sources wisely. In the recent interview with Ewen Chardronnet, you said that you got 'bored with all this critical theory that is just minor variations on the themes and literatures established by the new left by the 70s' – so you 'went looking for some new ancestors' (Chardronnet & Wark, 2015). These days, you are not the only one in the quest for new ancestors – for instance, Fred Turner is doing a great job writing the history of information technologies from Californian perspective (Turner, 2006, 2013). However, while Fred went into research laboratories of MIT and Stanford that produced the actual technologies we are using today, in *Molecular red: Theory for the Anthropocene* (Wark, 2015a) you decided to dip further back in time and across the planet. What inspired your quest for new ancestors? Why did you decide to look for ancestors in early twentieth-century Russia?

MW: I am a big admirer of Fred Turner's work. He is at Stanford, which is arguably at the center of production of new technology, so he can do what he does – whereas I am at the New School that has no sciences at all. So it is not as if I can just go to the place and meet the people. One's projects are always shaped by what is available, by what you can do. It just struck me that there is an interesting story to be told about Alexander Bogdanov as a sort of forgotten figure who, among other things, was an educator and a pedagogue. He was Lenin's rival for the leadership of the Bolshevik party, and was thrown out of the party before the October Revolution. In Soviet Russia, Bogdanov was always this problematic character – he was a real old Bolshevik, but the one whom Lenin personally hated. Whenever Bogdanov's books would get published, Lenin would make sure his own books got published or reprinted as well, so that his version would be out there.

Around 1904, as far as lots of people were concerned, Bogdanov was the Bolshevik party's intellectual center, and very much involved in experiments in what pedagogy would be for workers. During his exile in Tula, Bogdanov is in contact with the Labor Movement and he is trying to construct ways of explaining political economy to workers. He is involved with Gorky and Lunacharsky in the experiment Capri where they tried to create a

non-hierarchical collaborative collective learning process (Sochor, 1988, p. 9). So Bogdanov was involved in all sorts of open-minded procedures that tried to combine the knowledge that people get from their work, with the specific kinds of work that are the sciences and humanistic thought. He thinks that there is a specific role for theory as an intellectual practice that works in between different kinds of labor, and which tries to find a metaphor that captures what goes on in a certain process to take it somewhere else and see if it could work there. This actually ends up being a pretty good anticipation of how whole fields of inquiry get created!

A famous example would be complexity theory where, in the version of that story that Glieck (1987) tells, the field starts like a mailing list, of an old-fashioned kind, where participants get a paper, and everyone should read this paper, annotate it, and mail it to everybody else. In the mid-twentieth century people in physics would never read papers in meteorology, because it is such a completely separate thing. But the meteorology people have really good data, which you can use to start thinking through non-linear mathematics. They have got data sets that you can use to make models, and they have got experiments you can do, so you can get the next data and see if your models work. And so on …

PJ: These days, meteorology is all about computing …

MW: Exactly – this was before the computers could do all that. In Bogdanov's day, people had only incredibly low power computation, so they could only work with very limited experimental situations. So, I think there is something interesting in Bogdanov anticipating ways of working laterally across different fields of knowledge and about his method that is not hierarchical about different kinds of knowledge. These days, everybody assumes that science is a form of knowledge that dominates the world, and everybody believes in that assumption except scientists who are just saying: The climate is changing! Why don't you believe us?! It is clearly not true that science is as powerful as people imagine. Even though, science can obviously be heavily instrumentalized. You can apply chemistry to creating polymers and building industries, and the ruling class is just fine with that kind of science. But if you try to understand Earth systems, and come up with results that show that the ruling class is now leading us all to destruction – well, the powers that be are then pretty hostile to science!

But the problem in the humanities and social sciences is a widespread disinterest or disdain for how the natural sciences, particularly the Earth sciences, now impinge on everything that needs to be thought. In the humanities there is a tendency to want to pose as a rival for dominance to the sciences, to come up with imaginary ways of talking about something more profound than the empirical world the sciences try to measure and model. But I do not think anyone is very convinced by these quasi-theological claims humanists or theorists make about having a portal to a higher reality.

Or: us humanists get caught up critiquing or even policing other people's use of language, because language is after all the one actual thing we can claim to know something about. If you study language, then of course you think that *everything* is about the language. But if you do not study language, then it is not! It is about the data, or the math, or something else. What we need is a wider conversation that puts all these different ways of knowing parts of the world on an equal footing. Ironically enough for humanists this

would mean being open to the rules by which the sciences use language. In the sciences, there are quite specific rules about how the language should be used – Donna Haraway calls them the constrained stories (Haraway, 1991). The abstract needs to make sense, as a series of sentences, but it is not a poem. And it is not elaborate play with the language – it is precise. As a humanist, your job is to open language up, to play with it and show what it can do. This is a different, aesthetical way of making knowledge. But it has to take the sciences seriously as describing and conceptualizing real things, particularly now the Earth sciences. It is our job in the humanities to find ways of connecting that and other kinds of knowledge together in the common task of making a habitable and equitable world.

So Bogdanov seems like a good place to start for a kind of pedagogy that is not about hierarchies but about collaborations between different ways of knowing. I think that such pedagogy matters, and will possibly matter even more in the near future, as we cannot rely on the world remaining as stable as it is. The consensus is pretty clear: the Holocene is over, and the relatively stable climatic Earth-system that we are in is going away. The question is: Are there ways of preparing knowledge production now, even if the end of the Holocene does not happen tomorrow, but in one or two generations? Universities are supposed to be about this, right? It is how you train people not just for the labor force right now, but for the next generation and the one after that. I think it is necessary to take that long view. And if the universities have been so colonized by the vectoralist class and its narrow needs for commodified information, we will have to find low theory ways of creating knowledge for the world.

The rise and fall of civilizations

PJ: *Molecular red: Theory for the Anthropocene* (Wark, 2015b) tells the story of the two empires – the Soviet Union and the United States. Yet, as you said in the keynote talk at Constellations, *Molecular red* does not tell the usual tale of the Cold War where one empire was defeated by the other – instead, it tells the story in which the decline of one prefigures the decline of other:

> And the problem in both cases is not the relation of empire with rival forms of social organisation. The problem in both cases is the relation of social organisation to the nature upon which it depends. If there is a central problem in creating the new civilisation, a preliminary way of describing it would be to say: It is about the relation between socially organised labour and nature. (Wark, 2015b)

What, in this context, is nature? Can you describe the concept of nature in the Anthropocene, and compare it with the concept of nature from previous geological periods?

MW: I think there is a consensus, that not many would dissent from, that the attempt to make a Soviet civilization failed. It is probably a little more controversial to say that the American civilization is also pretty much falling apart. Yet, it seems fairly clear that our civilization is not built to last. Therefore, it is probably more interesting to think about this civilization as an attempted one, given that we may need to build another one quite soon. In this context, even failed attempts in building another civilization might have a new kind of relevance – so maybe we need a different way of telling the story of the Cold War. Rather than: they lost, we

won. The story is: they failed, now we fail. So then there's things to learn from the earlier failure. Starting with questioning the 'us' and the 'them' characters in such stories.

PJ: The same thing happens in Europe, and that conclusion does not seem so controversial any more. Rather than looking through national borders, we seem to be witnessing the fall of the Western civilization …

MW: One thing that went horribly wrong in the Soviet experiment is that it did not have another way of thinking about what nature is, that it tried to massively instrumentalize nature in ways that failed. The Soviet Union is actually surprisingly similar to the United States on this point. What is interesting in thinking about the United States and the Soviet Union, rather than Europe, is *scale*. Europe has become the thing of scale only very recently, with the formation of the European Union. Before that, it consisted of states that were big for their time, but they were not continents. Whereas, the United States is a continent, and the Soviet Union, compared to anything else on the planet, was almost two continents! So the United States and the Soviet Union were attempts at production of a civilization on an unprecedently massive scale. And now, one needs to think of scale at a planetary level rather than just at a continental level. What would it mean to create ways of knowing so that people can operate in specific contexts, but that are also not completely dysfunctional in terms of their impact on a global scale? And how do you train people to even think about that?

Bogdanov says the way we think about nature is always historically shaped by whatever labor happens to be in that particular point in time. That certainly includes a lot of magical thinking about what we think about nature. And we now have a mishmash of all of these inherited ways of thinking: whether we think that nature is a hierarchy (inherited from feudal worlds), or we think that nature is a marketplace (inherited from the world of commodity exchange) … These days, also, nature looks much more cooperative than we used to think in either of those two paradigms, so ideas of biological symbiosis now make a little more sense than they did in the past. Maybe it is because the big science these days is so massively collaborative, that one can think: whatever it is that all of the organisms that make a mammal possibly can do, looks like a giant science lab. And that makes sense, because you end up modeling one on the other, unconsciously.

PJ: How should we interpret these metaphors? What are they main constraints?

MW: Maybe there are ways we can try a bit more self-consciously to understand how we import metaphors that are really to do with social organization into thinking about nature. We should try not to exclusively see things through those metaphors, or if we are a little bit stuck without them, there are ways that we could use them a little more plurally, and to think not all of nature is explained through one unconsciously imposed model. We are going to get one part of the picture through thinking that nature is like a market, and another part of the picture through thinking that nature is like a hierarchy, and another part of the picture through thinking that nature is like a collaboration. Because it is a bit like those things, also maybe none of the above. In particular, when you look at biology, it is weirdly complicated and diverse, as the way that life has gone about some

things turns out to be: try everything. For every possible metaphor, it seems that life has tried it at some point or another! And maybe that is enabling in a new way.

A certain humanities training might be helpful here to do some modest 'debugging' on how we use language. In the past we took really limited metaphors from the nature. For instance, if we import the metaphor of the market into nature, and we export it back out, we inevitably bump into various questions. Who is the advertising executive in nature? Who are the lawyers in nature? What is intellectual property in nature? None of these things really make much sense, so it is not a very good metaphor. But if we could extrapolate unexpected ways of thinking and doing organization out of the closer study of the natural sciences, maybe we could get unexpected results. I think that would be a challenge for the twenty-first century because it is clear that some of the forms of organization of nature-and-the-social we now use will not work much longer.

So maybe we could look for other models. The humanities and the social sciences are really trying to wall themselves off from thinking open-endedly about the natural sciences. There are some interesting exceptions to that, one of which is science studies and particularly feminist science studies. Things that go through those paths have been the routes to open conversation with the natural sciences from the social sciences and the humanities, and the routes to get out of merely assuming in advance that there is no conversation to be held between those fields. There's still a tendency to want to just do the social sciences. But there is no such thing as just the social as the separate entity! That is what the Anthropocene means, right?

PJ: You are talking to the right person … This is exactly why I started doing these interviews with people from various fields!

MW: Given that we are likely to face problems that require all sorts of unexpected collaborations between different kinds of knowledge and labor, I think we have to view crossing disciplinary borders as a much more priority issue than it has been in the past. Climate science is real science – it tells you about the things that are happening now, the things that could happen in the future … But it does this through a simulation that models the whole planet, and does not tell you what to do about rising water in New York City. It does not give you an answer to that question, because there is a whole lot of other knowledge to think through what we are going to do in this specific situation. So, coming out of the Anthropocene is an agenda for collaboration, and translation, and finding solidarities … I do not ignore the differences between ways of knowing, but I do only want to deal with the differences that matter.

PJ: Together with the concept of nature, we also change our understanding of what it means to be human. Haraway's cyborgs (1991) have been born from the military-industrial complex, and Préciado's males and females are bio-chemical products of the sex-gender industrial complex (2013). In the age of metabolic rift, human identities are products of complex interchanges between our biological nature and labor – and closely linked to dominant capitalist ideology. Just like with the concept of nature, we cannot just ignore this dichotomy and call for reverse into the 'original state' – yet, we also cannot accept the underlying ideology as given. In the age of the Anthropocene, we are witnessing

the birth of the new human being. What are the distinct features of this new human being? How can we make this new human being truly free?

MW: There is not really a short answer, but that would be the project. The problem of freedom is always connected to the problem of limit, and happens within a limit, but now we have new data about limits that have to be thought through. I think that the Anthropocene really might be a change in worldview of the order of heliocentrism, or the theory of evolution. When Galileo says in public that the Earth goes around the Sun, it really does challenge us to think about what the order of cosmos is. When Darwin and Wallace develop the theory that says we are not separate from nature, that we are just another mammal, and that we all evolve in the same way – that is a challenge to a certain sort of cosmology that people inhabited. And now we arrive to the idea that Earth systems have certain limits, that it is all finite, and everything that we output as waste comes back to towards us. The idea that matter and energy circle all the way around has completely undermined any separation between the human and the non-human. They are just not separate anymore! Our bodies contain plastic that could have been made before we were born. Who knows? This stuff is everywhere.

So this is a real worldview shift that is on the one hand total, and on the other hand subtle in its effects on how you think about things. I know that I am within a thermodynamic system, which is entropic, and it is not an open system! We have to get out of thinking that it is. We cannot just keep dumping waste somewhere … It is not somewhere! It is everywhere! There is no separate place to put it. This change in thinking takes work on a number of levels. It is one of those things where the essential datum arrives from certain kinds of scientific knowledge, but processing of that knowledge takes a certain kind of humanistic knowledge and also certain kinds of art … It takes thinking through not just conceptually what it means, but also what it feels like, this new worldview you have to inhabit. So that is, I think, the collaborative problem between many ways of knowing and different ways of processing what it means to know. Consequently, it also becomes very much a problem of today's university.

PJ: However, many people still deny the arrival of the Age of the Anthropocene …

MW: At Eugene Lang College, I did a panel called Theory for the Anthropocene with Roy Scranton and Stephanie Wakefield, and afterwards I started to design an Anthropocene deniers' Bingo. You know the game played at conferences where everybody has to say the key things, and the speaker says Bingo? Every time I do this, I get the same kinds of denialism. For instance: 'Ah, this is old news, we already know this.' Or 'No, this is just a fad.' These are obviously the ideological responses, that cancel each other out. Then, somebody always says: 'Malthus was wrong … limits can always be overcome.' Well, that's just magical thinking. All these resistances are essentially emotional, and also if you are trained in something, you do not want to have to throw away that training. Everybody wants to keep on doing whatever it is that they know how to do. So in the humanities situation, you also always get: 'Well, Walter Benjamin talked about disaster so there is nothing new here.' What are you talking about? You cannot just run that filter on things, you need to read some other stuff and to think about some new problems!

There are interesting movements in the intellectual and the artistic worlds to stop dealing with denial. Time to really start realigning what we do is running out. You do not want to be talking about things like anthropogenic climate change all the time … that would get really depressing … It is how you take the knowledge of that, and then actually even forget about it for a while, in creating research programs and learning experiences that produce confidence and capacity for a changing world but without depressing everybody all the time. So we will just bracket denialism off and work in a different way, and let people exist in that state of denial of reality that characterizes everyday human existence.

But within the state of denial, people are still working on stuff that is going to be useful in the future. If you have little kids, you will not tell them the truth about the fact that they are going to die. No-one does that! That would be so disabling for a kid! They will ask when they are ready and you have a conversation. And about the Anthropocene, we are no different than the kids. You cannot keep telling us the bad stuff – you have to work from this phantasy base, where it is all going to be ok even though it is not. Because that is what enables people to generate knowledge and practices that could do what I think needs to be done: start building another civilization.

PJ: When you mentioned that people are trained to do something, and then they just continue doing it … It takes ages to get trained in the academia, so once they are done with your training, people really do not feel like going back!

MW: I think it was Niels Bohr who somewhat cynically said: A scientific theory that is wrong is only even proven wrong when everybody who made a career out of it is dead. It has always been strange to me, that people in diverse fields like particle physics and poetry do powerful things when they are very young. But it is so not true in the humanities and the social sciences, where people mature a lot later. It seems that optimum state of the organism to do these things can be quite different …

PJ: Speaking of age, it is also very interesting to look into gender. Recently, you attended the Anna Tsing lecture on a feminist approach to the Anthropocene (Tsing, 2015). Can you say more about this approach? What are its distinct features?

MW: I could not do a good job in reproducing Tsing's argument, given that I have seen the lecture but have not read her books. However, I think that there is a whole long line of thought to which Tsing belongs that is critical of the trans-historical abstract category of man, and a certain kind of scientific knowledge this category is co-producing. From that thought, you can go in two different directions. One direction is that the answer is poetry, so you do away with both the idea of scientific knowledge and the idea of abstract universal man as its subject. The other way is more interesting, and it is the way of the feminist science studies. It is not just about throwing away the science part and just doing poetry – it is about throwing away the mythical, but often not very satisfying and even not very scientific, category of Man as a subject that creates knowledge. This approach gets off the path to some sort of universalizing, abstract practice of transforming (particularly colonial) worlds, via a universalizing reason that always thinks it knows better. But it does not throw away the sciences themselves, as struggles to know particular parts

of the world. That strikes me as a much more interesting path, particularly in applied sciences.

One of the great examples Tsing offers is Fordlândia, an abandoned pre-industrial town which was founded when the British government made a deal with Henry Ford to do a rubber plantation. It was a huge and massive failure, as they did everything wrong. If Brazilian rubber plants stand next to each other, the fungus that destroys them called tree blight easily gets from one to the other. Whereas, in the jungle, that does not happen because the plants are far away, so the plants can sustain themselves even with the tree blight. So the plantation was built, people thought, to maximize production of rubber – but it was really to maximize the production of tree blight! There was probably a bunch of day laborers on the plantation who had better knowledge of why this would not work than the people who thought that they are experts. So I think that would be the road to go down – we need to critique the universalizing subject that is supposed to know. A famous version of this has got to do with Haraway's interpretation of Robert Boyle's idea of the scientist as the modest witness (Haraway, 1997), where it is only a certain kind of gentleman (in the original formulation), who has the keys of observation that can actually produce science. Perhaps we are better off with empirical sciences about particular things that are produced by empirical and particular people, rather than by some universal myth of a person. Perhaps we need to work through, rather than ignore or suppress, how social differences contaminate supposedly universal knowledge. That might actually be more 'scientific'.

PJ: Talking about the new human, and the distinct features of the new human … what kind of education do we need to provide to the new human being?

MW: Maybe it is more about the dichotomy new vs. old, to be a little weary of the *novum*, or the idea that everything has to be new. One way of doing something, that is certainly not new, is to think of the archive differently, and to question what we think we are inheriting from the archive. We might want to look at the stories on the side, because these might be a little bit more relevant for a particular situation. This particularly refers to humanities-based knowledge where people take ten big names and do endless variations. Every year someone has done a new book on Walter Benjamin, which contains essentially no new information. I do not mean to criticize people who spend a lot of time committed to interpretations of Walter Benjamin, but why just him? And that question is not asked. There are reasons that Walter Benjamin spoke to the 1970s, but does he still speak to the 2015? And maybe his theory is not the place to look, maybe you can find somebody else.

In *Molecular red* (2015) I chose Bogdanov, for example, because he was much more interested in the natural sciences than a lot of his contemporaries who were trained in Marxism. And, in pre-scientific ways, he almost got climate change right a couple of times. No-one had the toolkit to grasp climate change in early twentieth century, but Bogdanov sort of gets something like the carbon cycle right. Now that is interesting – having the intuition about something before we really need the tools to deal with it. So maybe Bogdanov is someone to go back to. Arguably, the first thing is to be careful about things being new, and maybe one way of doing that is to change the relation to the past. Other things I would like to address are: Can knowledge be a little more agenda-

based? Can it be driven by agendas in the world, rather than driven by the eternal construction of problems in academic fields? And then, can it be more collaborative? Can we get out of the private-property model, where everybody has their field, and if you write outside of your field, you are considered to be trespassing?

Writing a blog post about Pasolini, I got violently attacked by some Facebook friend. This person spent ages working on Pasolini … I clearly respect that. If I was doing more work on Pasolini, I would want to read that secondary literature, by this person and others. But if you read the secondary literature, you have got no time to read anything else. Then it becomes your life. So I think that we need to get out of the prioritizing of the hedgehog model of digging the same hole and owning it, without completely denying the model or its value. The hedgehog approach has enormous value, but I think that we need a little bit more of the interstitial connecting tissue approach, the fox approach, where you find a way to jump from one thing to another and connect them to things that happen in the world. We need to do it in a way that is also a little experimental, open-ended, so what I am suggesting is not quite a pragmatism that says we must only train the people to do the things that need to be done. I think that we do not know what needs to be done, so we need training that is much more open to possibly alarming or at least interesting new situations. There is a quote attributed to Hunter S. Thompson: 'when the going gets weird, the weird turn pro' (Thompson, 1985). So the question becomes: How do you produce weird people for the weird times we are in? That strikes me as one of the really interesting challenges for education at the moment.

What if this is not capitalism?

PJ: Arguably, human beings arrive to existence only in relationship to their labor. In the network society, traditional labor has significantly transformed. What are the main characteristics of digital labor? How does it differ from its pre-digital counterparts?

MW: These things are a little bit more subtle than they are often understood to be. The first part would be to understand how what we would formerly think of as factory labor has also been transformed by information, and to understand how such labor can be controlled at a much more abstract level and at a much finer grain than it was ever possible before. An emblem of this would be those inactivity reports about Amazon warehouse workers: if you work in a warehouse, and you stop working for forty seconds, the system knows (Peer-to-peer Foundation, 2015). That kind of traditional little leeway that factory work included, even at its worst, to find the place where you are not observed, and stop work for a minute, even that little margin has been taken away.

The second thing is that, on a global scale, factory labor did not go away at all. In some way, you can say that the golden age of Fordism has just started! Labor did not become immaterial. There are millions and millions of factory workers in China, making shoes and computers and whatever … Labor is more material than it has ever been! It is more based on the extraction of more kinds of exotic elements, with more factory processing, using more energy – and we are in the middle of it. This is not a postindustrial, immaterial world that we live in at all. So what we think of traditional forms of labor became informationalized to the disadvantage of the worker. If people strike in their factory, in places like

China – and we also live in the great age of labor unrest – their struggle it is not coded through the traditional labor movement, because that language is not available. As those workers have figured out, factory labor is a non-fun job that you do for life, and you can no longer go back to the farm. So there is a lot of labor activism, just not through official unions or the old labor movement language.

Third, there is the other kind of phenomena that is much more common in the over-developed world, where people work specifically on the production of new information. (The over-developed world is not the same thing as the West – there are pockets of it all over the world.) And, is that even labor? There is a sense in which you cannot quite industrialize it. Genuinely new ideas do not arrive on time. And it is interesting that some of the models that organize such work come out of big science. It is not accidental that companies like Google and Apple think of what they are building as a campus. And they are setting that up in a way of a really top research lab. However, this involves being able to separate out the innovating part from the routine part. Then, a lot of support labor can be rendered routine. The classic image of someone in a biology lab doing one pipette after the other … it is like factory work. You do this to earn your Ph.D., and then you get your Ph.D., and then you do this to win a grant. And so on. At one point, to try and find another name for such work, because you cannot quite run it like labor, I called these people the hacker class. The hacker class does not correspond to the same threats and promises like labor, and it needs to work on its own time.

So: one, informationalized labor, but; two the vast expansion of global labor; then three, rise of the hacker class in the over-developed world, making new forms but not filling forms with content as labor does. And then the fourth thing, and this one is global, are ways of using information to extract value out of *non-labor*. And that is really pretty new. So, as you walk around New York City with your cellphone, you are generating data. You are not really at work, and you are certainly not getting paid for it. So, to an extent, we have a new kind of political economy that is about unequal exchanges of information. It is based on ways to extract information from labor, not labor and from the hacker class as well, who produce the forms in which information will be extracted. The vectoralist class extracts surplus information from its control of the information vector. It extracts information where ever you are working, not-working, hacking. It even tries to exert power over the capitalist class through control of information, relegating capital to profiting from the mere making of things.

PJ: For most people, digital labor cannot be divorced from capitalism – which, in turn, is dialectically related to metabolic rifts in all areas of our existence. Carbon liberation and its consequences on planet's climate are merely their most prominent manifestations … However, already a century ago, Bogdanov offered a way to look into science and labor together without reducing them to exchange value. In *Molecular red* (Wark, 2015c), you took lessons from Bogdanov into the age of the Anthropocene. How can we imagine digital labor that does not perpetuate the logic of capitalism and the associated metabolic rifts?

MW: I understand metabolic rift a little differently to Foster (1999) and others who very rightly drew this theme out of Marx (1981). Sometimes metabolic rift is read as society being out of whack with nature. However, I am not happy with making that distinction

in advance, so you can really just think of metabolic rift as geophysics where you have got some widening metabolic process of an unprecedented kind passing through the whole planet. Clearly, the key process is carbon. If you take carbon that took millennia to get in the ground and then stick it into the air within decades, that is a metabolic rift – and you can expect weird things to happen.

But carbon is only one metabolic rift, and we may bump into other limits as well. I do not know if peak phosphorus is a real thing or not, but people are starting to discuss it. Modern industrial agriculture relies on compounds of phosphorus. So have we run out of accessible phosphorus? I do not know the answer, but there are people debating it. If you look through the periodic table, there are all sorts of elements, some of which we need in certain compounds, which are starting to get rare, or very hard to extract. It is not just the hydrocarbons. So at that point, we might have to rethink the whole thing. Metabolic rift is a strange thing, and with many layers – when we got to seven billion people and counting, we really put the strain on the infrastructure that holds that together.

PJ: So what is digital labor in that context?

MW: We need to understand that digital labor is not immaterial, that it is heavily implicated in processes of extraction, manufacture, and energy usage. Datacenters are probably making measurable contributions to global warming just on their own, because of the amount of energy that they use, and the amount of heat that they produce. The energy overhead of just running the information infrastructure is not negligible. It is also implicated in e-waste – there is nothing really you can do with electronic devices after you manufacture them because they were not made to be disassembled in any useful way. There are all sorts of elements in these devices; they basically run on the periodic table. This is so different from nineteenth-century capitalism when people just started to figure out some basic chemistry. Now we are using the whole periodic table in the most elaborate ways, and producing compounds that do not exist elsewhere in the Solar system and never will be produced by any other process. What should we do with that stuff?

Digital labor is not separate from all this. It is deeply implicated in the metabolic rift, but also capable of generating ways of cognitive mapping that might explain how it works. We now have the data, the critical attention to data, the modelling, the images, the forms of visualization, the ways of telling a story, that can explain how these things add up and at what points they might be changeable and at what points they are not. So is there a particular way that you can connect the skillset of the hacker class with its sense of its self-worth, and its particular value to other agents that recognize what the problem is and what to do about it. So that strikes me as a twenty-first-century project to get on with.

PJ: Critics often forget that capitalism is indeed a big problem of our society, but it is not the only one. As you said in the #FOMO keynote address, 'were capitalism to be abolished tomorrow, the problems of the metabolic rift would not thereby be magically solved'. This is why we need a theory for the Anthropocene – the age where 'social life can no longer be thought of as an autonomous sphere separate from its base and the material conditions of its existence' (Wark, 2015c). Can you pin-point some directions towards analyzing issues of the Anthropocene beyond capitalism?

MW: The first thing to do is a thought experiment: What if this is not capitalism, but something worse? And how do you go about describing this? This is a pedagogical challenge. Let's suspend believe for a moment that capitalism is the eternal and unchanging essence that it thinks it is. What if there is already a new, and even worse, mode of production that works like a parasite on top of it? I don't care whether I persuade anyone of this or not. It is more like a science fiction story. Can people suspend disbelief long enough to think through the world this way? That's the challenge. Capitalism is a second order system based on unequal exchange with primary production. What if the second order system of capitalism was in turn based on unequal exchange of information rather than energy or material goods? From this point of view, there are ways in which even the capitalist class is now a relatively subordinate class, in that that you can run a global *Fortune 500* company now and not produce a thing. You can outsource all production to dependent capitalist manufacturers. Apple does not make computers or phones – and does not have to.

So is there something worse than capitalism, perhaps on top of capitalism, that controls even capitalism, and where unequal exchange of information is based on a whole global informational infrastructure? That might be the kind of thing that we are dealing with. Maybe it is indeed worse than capitalism. It is not that techno-utopian story, but it is also not the story of 'all we have to do is negate capitalism and then our problems are solved easily'. This is clearly not true. How do you produce for the needs of 7 billion people? So to think both on a very small scale and experimentally: What are the forms of life? And to think on an abstract scale: How is the planet running in this moment, when everything is implicated in everything else? The fact that these scales do not join up in the middle is the teachable moment. Everybody always wants to know: What is the solution? I do not know. No-one knows! No-one has any idea! So looking at some of those local experiments in sustainable farming, and then looking at global metabolic rift. It doesn't add up. That is the teachable moment. People want answers rather than questions – and the whole thing about pedagogy is about finding the right questions.

PJ: Arguably, teachers should be on the forefront of social change. However, current work in schools and universities is still tightly interwoven with the logic of capitalism. How can we hack the current educational system in order to reach beyond capitalism? Should we get rid of traditional schools and deinstitutionalize education, as proposed by Ivan Illich (1971, 1973) and the deschooling movement (Jandrić, 2014), or should we build alternative institutions? If so, what kind of institutions should we build?

MW: I think that this question depends on the tactics of the local situation. In the United States at the moment there is a coalition forces at work that really want to abolish public education altogether. Its partly religious fundamentalists, partly an ambitious middle class, partly a component of the vectoralist class that wants to enclose and 'privatize' the whole of education as an information services business – and wants to collect state revenue to do it. So I think in that situation you have to defend the public system at all levels, at least in principle. But in practice public school in some places in America is just a disciplinary and surveillance space. It is essentially a sort of pre-prison. They go to part-time prison until they are about 15, and then they go to real prison. That is essentially what we have created.

PJ: Henry Giroux and the school-to-prison pipeline (2011) …

MW: Yes, it is a real thing. And scary as hell, because you are producing an entire population with only criminal skills and options. That is what they are trained to do by this very system! There were not given the option to learn the violin or to do trigonometry or even basic office skills – these things were not even on the table. Then, there are also these middle-class debates such as: Should we send our kids to the magnet school, or the one with the hippie pedagogy, or the new charter school? Poor people do not have all these choices! Someone has got to be able to physically take them there. If you go to a chain coffee shop, here in New York City, it will be African-American women making your coffee. They got told at a very short notice when their shift was, and there is so much control over their labor and how they do it, that they just have no choices about schooling! They have got to go with whatever enables them to put food on the table. There's a tremendous waste of human potential.

So I am a little weary of the rhetoric: 'let's destroy schools and reinvent the schools!' For whom? In the United States, you don't hear in public debate the idea that schools should be for everybody. And I think that is really crucial. We are just letting go a lot of human potential – let's not call it human 'capital'. They are surplus population! An economy that does not know how to make use of the capacities of its people is clearly dysfunctional. In another context, you can experiment with pedagogy – that is awesome! However, there is also something to be said for all those supposedly outdated virtues of our public system that produces pretty standardized educational experience, where all kids learn fairly similar things, where all kids learn actual science and math and so forth, and are taught to read and think for themselves.

In education, there is a sense in which even community involvement can be a double-edged sword. So when the community is saying – 'Look, we speak a different language, we have a different history, why are is it not in the curriculum?' – I think that you want to listen to that. But when the community is saying – 'We do not believe in physics and science!' – you need to say – Hey, wait a minute, we could teach some critical things about what has happened when physics is applied to the world, but I am pretty sure that the Earth goes around the Sun. We are keeping that part. So I think that these things are always tactical.

Gamer science

PJ: Speaking of teaching, we must also take a look into research and, more broadly, the structure of human knowledge. In the 2011 TV interview dedicated to the legacy of Marshall McLuhan, you said:

> I think that universities need charismatic outsiders from time to time, to shake things up and show how they can be done otherwise. I guess that this is one of the functions in the accumulation of knowledge. But this is not the regular routine: staff which is adding brick by brick our understanding of one thing related to another … There is a sort of impersonality about scholarship. But every now and then it needs this other figure. (Wark, 2011b)

This quote immediately reminds of Thomas Kuhn and his scientific revolutions (Kuhn, 1962) – which is hardly a surprise, since Thomas Kuhn (1922–1996) and Marshall

McLuhan (1911–1980) were contemporaries. However, there has been a lot of water under the bridge since they developed these theories. What is the role of the university in knowledge production in the age of digital cultures?

MW: I think that Kuhn's view about how scientific revolutions happen still partly holds up. We might have moved on a little bit, because Kuhn thinks entirely from the point of view of the revolutionizing theory, and I think that the key thing now is to think about the diversity of things universities have to do. In this context, I think that Peter Galison's work is worth attention. He points to the separate and connected evolution of scientific theory, experiment and instrumentation. The breakthrough can happen at any of those levels and they don't all change on the same schedule. Often, a viable theory is what you can actually test at a certain moment in time. Kuhn (1962) left out those other temporalities, while in Galison's mind, one never determines the other (Galison, 1997). There are these odd (non-)overlaps between the history of the scientific approach to testing things; who is actually building the apparatus; and the temporality of people thinking what might be interesting to test. Particle physics has reached the point where the theory has gone on for decades, and people have whole careers based on untested theories – simply because we have not come up with an apparatus of the scale, or even of the type, that could figure out these tests.

One way of going about this would be to privilege neither one aspect of what the university does nor one type of coordination that might be going on. There is really something to be said for those modest and uninteresting scholars who represent, for their generation, whatever it is you need to know about X. They have their own little world of petty jealousies, and rivalries, and stuff, but they are scholars of a useful kind. They do not think they are Kant, they can just tell you what Kant did and why it matters. And they know all the other people who do the same thing. That's it! That is all they are doing. But if you want to do something original that goes off from there, you need that person. And they are often not that exciting. Their writings are not that thrilling. And somebody else will have their job, doing the same thing, when they are no longer here. But we need all that! This is often a part of the bureaucratic side of the university, but I think it is really necessary that people are just repeating the stuff.

PJ: Like librarians, for instance …

MW: Yes! We need librarians! They know where stuff is, they can find it for you, so when you need something – you go and ask the librarian. And they often even know what you might want in the future. That is an astonishing thing about the librarians – they know what you want before you know that you want it! I think that different bits of the knowledge apparatus involve a wide range of personality types and knowledge coordination types, and that you can never build a department around any one of them, let alone a university. You are going to need a charismatic self-invented figure who is often not too generous about acknowledging where he got the knowledge from – because they often do not know. They just hope they made that up! But they are just absorbing and impersonalizing that knowledge … I have to plead guilty of being in that mode. In the production of knowledge, however, you depend on all these people who are their fields, who are holding them up, and you depend on all sorts of other labor. So we should really think of knowledge as a

vast collaboration, and up to very recently, as a non-commodity kind of production that worked really well. If anything worked well, for the last couple of centuries, then it was the universities. That is why I am a very alarmed that people want to destroy them.

PJ: What is the impact of digital technologies to our understanding of human knowledge? Can we speak of distinct digital epistemologies? If so, how do they differ from their analog counterparts?

MW: I think that we are really just starting to grapple with that question, and frankly, I do not have good answers and I do not know who does. Some things just seem relatively unprecedented, in that what you can do with very large datasets really is pretty new. The way I looked at this in *Molecular red* (Wark, 2015a) was through climate science, where a lot of its modern history has got to do with understanding the underlying variability that the data is built on. Even under ideal circumstances, the data from weather forecasting is questionable simply because the world changes – you cannot have a weather data station in the same place for the century because the place does not stay the same for the century. Climate science is a big data science which shows how difficult big data science is – and why some of the claims made for big data are rather questionable, particularly when, unlike climate modeling, you don't have a good equation against which to test the reliability of the data.

And climate science is also really interesting as a branch of knowledge based on really massive data sets produced by a *global* infrastructure and global scientific collaboration, right through the Cold War under both difficult and promising circumstances. During the Cold War, both the East and the West wanted to appear as if they were collaborating on science. And this collaboration played into the postcolonial moment really well, because both sides wanted to look like friends with the developing world. Give us your weather data, and we will share our results with you! So climate science is built on information technologies, on global infrastructures, on big data sets, but also on subtle geopolitics – if you think through all these elements, it is a model of what a lot of knowledge production is getting to be like.

However, we are often behind in asking hard questions about the data set, and I find that part a bit alarming. For instance, when the big data set is proprietary and cannot be shared, so you are reading research results based on data that no-one can check. I saw a really great example based on a massive dataset about cellphone calls that was about the second most frequent person everybody calls. The most frequent person that most people calls is probably their life partner. So the research question is: Who is the second one? The friend? The study is based on certain assumptions, that are questionable, but it gets good results about gender differences and about the changes through time. However, you can never verify this result! The study is based on some proprietary data set, and its author cannot even tell you which country it is from! And I think it is important to say that this study is probably not science. If the data is not public, it is actually not science – it is something else that you are doing, and you cannot claim the glamour of that name.

So there are significant questions to be asked about data. At the same time, one very important breakthrough from climate science it that other branches of Earth science have also started to quantify complicated processes. The resulting forms of knowledge are based on simulations. It is a simulation science. Even just explaining why it is a science,

to people who were not trained in modeling and simulations, is very hard. But it is science, and – within certain limits – it yields important results. So, it turns that Baudrillard (1995) was sort of wrong about simulations – if you do it right, they are actually one of the most reliable forms of knowledge that you can produce! But he was also sort of right. The simulation is more real than reality. But epistemologically, you have created a simulation of a thing based on certain simplified assumptions that may or may not be robust enough to give you an account of what is happening. In climate science, there is a good test for the simulation: Can it 'predict' what the climate of the *past* was? But in a lot of simulation based knowledge there is no way to verify.

PJ: And how does that reflect to the social sciences and the humanities?

MW: It is both encouraging and alarming that there is a certain prestige now attached to doing work in that area in the social sciences and even in the humanities. There is a huge growth in the digital humanities, which I find really interesting. To my knowledge, however, it has not yet produced a really counterintuitive result that is also persuasive. A lot of digital humanities already confirms things that we know through other methods – that is interesting, but not super interesting. If somebody was about to tell you something that you would absolutely never have guessed, about the history of the novel (and these things exist!), based on a data set of 30,000 nineteenth-century novels – that result would be interesting. But it has not really popped out yet.

Actually, this puts you in the systems that are very gameable. Sometimes digital humanities are almost like a computer game – there is always some way you can power up a career if you just play it the right way, even if no interesting results are really produced. I am often told how important scholars are because of how much grant money they raised, rather than what results they got. You are doing the thing that gives you the points, rather than the thing that would give you the really counterintuitive robust result. Yet, given that no-one has a better idea to how to coordinate knowledge on the scale of the moment, gamification of the knowledge apparatus is something to not entirely dismiss. It is also a scale problem – we are probably looking at millions of knowledge workers, generating God knows how much data and how many scientific papers. To comprehend all that, one needs those second order tools that Vannevar Bush was so charmingly talking about within the mechanical system (Bush, 1945).

Consequently, we are probably significantly moving away from that moment when individuals can do anything significant at all. In any field, you are a part of an apparatus. However, if we think about this dialectically, then what is the role for people who are able to individualize themselves within that system, and then appear as the unique coordinators and/or specifiers of what knowledge is? This is almost like a form of art. I do not wish to discount why Stephen Hawking is famous in his field – but he is also an artist. He is a performer. He is able to perform a role that coordinates lots of domains of interest around cosmology. So it seems, in a world that is much more impersonal in how it produces knowledge, there is actually an enhanced role for something personal, for the art of singularizing a whole field in a personal vision.

PJ: Few years ago, you conducted a very interesting interview with Kim Stanley Robinson (Wark & Robinson, 2013). Together with William Gibson, Ursula LeGuin, Isaac Asimov, and

many others, Robinson seems to capture the spirit of his times really well, and also to produce some fresh insights. In his case, instead of ubiquitous dystopias, he offers scientist-heroes and various leftist utopias. What is the relationship between science fiction and science? How does science fiction enrich our understanding of the world; what are its limits?

MW: One of the other things that we need besides science, broadly speaking, is arts. And Stan is a popular novelist, but where his 'people' includes thousands of people with some technical or scientific training. I think that science fiction is one important genre, but not the only genre, that enables a certain conversation between people whose work is otherwise quite specialized and trapped in worldviews and metaphors derived from that specialization. It is commonplace that science fiction is not about the future, but about alternative possible presents. Science fiction is one of the things that enables you to think through relationships between different kinds of knowledge … Science fiction is not always about science, some works actually ignore the science, but it is usually about a geopolitical reality. There is a book called *The city & the city* (Miéville, 2009), that is among other things about Israel, about Balkan wars, about living right next door to someone who is 'not there'.

However, Stan … he studied with Frederic Jameson, the American Marxist and cultural critic; Gary Snyder, who resembles a Buddhist poet of the mountains; and also had significant encounters with the sciences. So he tried to put those three things together. To me it is relatively unique to try and diagram these three very different kinds of worlds, all of which are deeply Californian. That is another thing about Stan's work, it is imbued in that post-war ambition that California would be the cultural hub. Jameson had a job at San Diego; California is one of the most important hubs of twentieth-century science; and California is also counterculture. And Stan tries to fit these pieces together – instead of putting them into conflict with each other, he develops form as dialogue. So that would be just one example.

There is a Brazilian science fiction movement called solar punk, which decenters this a bit more, which is interesting. Then there is Afro-futurism. In an ideological sense, Africa and African languages represent the past – so what it means to think *futures* through an African lens strikes me as a really interesting cultural space. In order to put together images, stories, or feelings that do not exist in the mainstream yet, you need both the popular and the marginal. Eve S. Mosher is an artist who used a line marker for football fields, to mark shoreline in Brooklyn where the water is going to be in 50 years' time (Hanscom, 2011). Obviously, that is not an exact science – but we know the water will be high, right? And it is striking to see that places we walk every day could not exist in my kids' lifetime. Sometimes even quite 'marginal' forms of art have quite specific use.

I think that movies like *The Martian* (2015) or *Gravity* (2013) are essentially about the Anthropocene unconscious. They are about how remote the social is from the natural, they show that disconnect, and they are about ways of thinking through what their relation would be. So I think that the unconscious of the popular culture is really processing this. It is alive and well.

PJ: We spent a lot of time talking about the relations between hard sciences and social sciences and humanities, but we did not really touch upon arts …

MW: *Gravity* (2013) was made by some great filmmakers, and the whole social existence of its protagonists is a fragile space station that is going to crush into the Earth. It is an image that helps you to process the feeling of the Anthropocene without directly confronting the issue. That is what I find interesting. There is a slightly worse version in *The Martian* (2015), where the planet is going to become unlivable very soon, and the protagonist is a biologist, so let us see what he can do. But this is an individualist struggle, that leaves out the collaborative dimension and over-estimates how easy even that imaginary situation would be. It is always good and bad to look at these things through a popular lens. Cinema knows. Hollywood is the popular unconsciousness, and it is now all about the Anthropocene. Art still has a role in working on the unpopular unconscious, in hacking new forms to express it.

From self-delusion to critical action

PJ: In few days from now, here at The New School, we will participate in the Platform Cooperativism conference. In the introductory text for the conference, Scholz writes:

> For all the wonders the Internet brings us, it is dominated by an economics of monopoly, extraction, and surveillance. Ordinary users retain little control over their personal data, and the digital workplace is creeping into every corner of workers' lives. Online platforms often exploit and exacerbate existing inequalities in society, even while promising to be the great equalizers. (2015)

In opposition to the described platform capitalism, Scholz proposes the alternative in platform cooperativism – and the conference is presented as 'a coming-out party for the cooperative Internet' (2015). Can platform cooperativism really 'put power back in the hands of the workers' (Milland, 2015)? What are its main strengths and limitations?

MW: Well I hope so! The Internet that I first discovered in 1980s was purpose-built for scientific knowledge. And, inside the sciences, you would meet fellow researchers who were using the Internet. You needed to know how to control the shell of the UNIX system, you had to teach yourself emacs, you had to teach yourself a mail reader like pine, and then how to use ftp to go and get other people's files. And even when the Internet became the Web, it was still purposefully built for the so-called scientific knowledge. The World Wide Web was invented at CERN, right? And it was invented to help working on a knowledge problem. Tim Berners-Lee just said: 'forget physics just for a minute, there is a knowledge problem, so let me build this thing that will help us figure out how to organize it'.

But when it got to Web 2.0, the Internet was not about knowledge anymore – it became something else. Web 2.0 is about building a layer on top of scientific knowledge – that of surveillance, value-extraction, and information extraction. And these worked their way through the Web in the things like the cookie. The tradeoff is: the Internet will look like it is tuned to your particular presets, needs, and habits, and you will give up your data. So this is the beginning of an unequal exchange of information. In early versions of the Internet that I first learned, unequal exchange was not even technically possible. People would tolerate you being around, but if you did not contribute something useful, they would ignore you. So you had to find out ways to earn your keep in a collective space.

But that is gone away. To me, platform cooperativism would be going back to things that have been lost – the 'silver age' of social media.

I think that is what animates people like Richard Stallman. He experienced the utopia of a collaborative production of knowledge in the early days of computing. And these days, it is all shut down. So he is holding onto collaborative production of knowledge like a lost craft value. He is like a craft worker at the dawn of the industrial era saying: we are losing all the good stuff about how this used to be done! He is our William Morris. But a lot of contemporary Internet users do not have that experience, as they just experienced these lockdown proprietary environments and find them unsatisfying and increasingly controlling their labor. So are there ways to build different kinds of platforms in spite of the negative current?

The proprietary Internet is actually not at all that ubiquitous. There are other ways of doing things, even on a small scale, and it is possible to build things that can coordinate labor in a different way. So the above question strikes me deeply, given that a many people now think that this super-commodified surveillance version of computation is somehow inherited in its nature. I do not really think that is true … I think it is the sum total of winning a couple of battles and losing the war about what information technology would be like. So if the Internet has any affordance of personal freedom and empowerment at all, it is because we won a couple of struggles about what the Internet was supposed to be. However, what we lost in these struggles are mostly surveillance and value-extraction, and now they are filling back into the university. And it is a bit contradictory, to say the least. You want to tell universities how to organize information? We invented the Internet! We invented computation! All this stuff exists, because we invented it generations ago! And now you tell us that we do not know how to do business? No!

PJ: Your theory for the Anthropocene is covered by some rather grey overtones. I bitterly smiled at your story about playing Sim Earth where you changed ecological parameters of the Earth – only to wake up each and every morning to find it cooked or frozen (Wark, 2015b). Yet, you seem quite positive about the future. You ended the keynote presentation at Constellations by saying: 'it will be fun to make a new civilization' (Wark, 2015b). You began another keynote address, at #FOMO: 'The good news is: this civilization is over. And everybody knows it. And the good news is: we can all start building another one, here in the ruins, and out of pieces of the old one' (2015c). Is this a sarcastic way of dealing with reality (which, admittedly, does help alleviate some tension and despair), or true optimism? Does the humanity really have the ability to transcend the relationships between labor and ecological destruction, and create a sustainable future? What, in your opinion, is the way to from here?

MW: The one thing I take from psychoanalysis is that we really live in a world of pure self-delusion, so the idea that you would confront people with reality and they will change their behavior just does not work. So you confront people with a different delusion to the one they are in, but one that might be more enabling, and then maybe you get people to act. I do not think that this is about optimism or pessimism, actually, as I do not find the distinction very helpful. It is more about experiments in trying to calibrate what realism might now be, where realism is even a double-edged thing in a sense that if we are all really realist, we will just give up in despair and go shoot ourselves. But we

do not, so the self-delusion in which we live probably prevents us from despair. So 'realism' here would be high-functioning delusion more or less compatible with reality that is not psychically disabling.

So which self-delusion would be more finely attuned to what needs to be done and what might be livable? That strikes me as the way to frame it. I have been to those presentations where people trained in the sciences present slide after slide of data, and then raise their hands and ask: 'Why is no-one listening? Why is no-one listening? Not just to me, but to all of us?' Well, it does not work that way! They just do not understand anything about human nature … You are going to show us the data, and we will change our behavior? No! It never worked! You have to tell a story, create a feeling, that will also be a delusion. The irony is that you need the imaginary world to come into play there.

To me, saying that this civilization really is ending, is just an attempt at a possibly a true statement. And we know that, don't we? It is not news, it is not controversial. Interestingly, no-one ever seems to dispute it that much. But how do you not flip into the resigned state and think that there is nothing we can do? I find that absolute cynicism that wants to doubt and critique about anything so disabling for the production of knowledge. So instead I ask: How do we create a more viable illusory world that one might inhabit, that might not have the granger that modernity had? Given that we do not yet face that horizon of infinite possibility, how can we get some sense of it?

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